

Contribution No. 178  
U. S. Fish And Wildlife Service  
Bureau of Commercial Fisheries  
Biological Laboratory  
Galveston, Texas

FISHERIES HYDROGRAPHY. By Ilmo Hela and Taivo Laevastu. Fishing News (Books) Ltd., London. 1962. 137 pp., 69 figs., 8 tables. £ 2 15s. Od. (\$7.70).

The authors of *Fisheries Hydrography* boldly summarize in 98 pages of text (interspersed with 67 figures and 8 tables) better than half a century of investigation by marine scientists the world over. Reference is made to almost 280 technical papers and texts from which has been drawn material to support discussions on: (1) the environment's influence on fish behavior; (2) the application of hydrography to the more efficient pursuit of fish stocks; (3) the usefulness to the fisherman of meteorological reporting services; and (4) weather and hydrography in the prosecution of coastal (as contrasted to high-seas) fisheries. One may surmise from this that any attempt to cover so much ground in so little space could only have resulted in the most cursory treatment of the majority of researches cited. Such has unfortunately been the case, with the end product constituting not so much a real and useful synthesis of available data as an annotated but incomplete bibliography.

In all fairness, however, the authors make no pretense of their book's comprehensiveness. They state at the outset (p. 7): "... it is obvious that this presented text cannot be an extensive treatise of all the aspects of fisheries hydrography. Moreover, the approach has been directed by the specific individual interests of the authors, as is usual in most books. The authors have been courageous enough to make this approach in spite of the obvious limitations in its scope. . . ."

If the text be viewed from this perspective alone, then its usefulness as a reference for the beginning student of applied fishery science and oceanography, for the more astute fisherman, and, perhaps, for the layman, becomes immediately apparent. Accordingly, the authors are to be commended for a monumental effort. But, in their explanation of the book's purpose (p. 7), they curiously contradict themselves. They first state that "This book summarizes in a semi-popular manner and as simply as possible the principal results of research in the field of fisheries hydrography during the last six decades. It also shows how to apply facts and principals of oceanography and maritime meteorology to fisheries problems. . . ." Refuting the preceding one, the very next sentence says: "Obviously this book is not a 'how to do' manual but rather a textbook on the subject. It is primarily meant for fisheries biologists. . . ."

The uncertainty with which rationales of cause-effect relationships in the marine ecosystem are universally imbued is first hinted at in Chapter 1 (p. 15) where the authors indicate that to define "fish-

eries hydrography" would not be feasible. Instead, they "... will try to describe [it] briefly, ... and to show its relations to the neighbouring sciences from which it has been derived. ..." The philosophy sustaining this approach, they relate, stems from an aphorism attributable to the French mathematician Poincaré, namely (their words), "... that what we gain in exactness we usually lose in objectivity. Only by withdrawing from reality do we acquire perfect purity. ..." Is this an apology for the fact that the research cited later has generally failed in the unbiased revelation of truly functional cause-effect relationships? Or does it represent a subtle justification for the inclusion of material about which the authors have hidden doubts? In any event, the reader is at least informed (perhaps inadvertently so) that "fisheries hydrography" is a science (?), but a really meaningful answer to the question heading Chapter 1, "What is fisheries hydrography?," is yet forthcoming.

One of the book's main difficulties seems to be its oversimplification, its allusion to the idea that a particular feature of the marine environment—by itself—can control directly the magnitude and distribution of individual fishery resources. This is not necessarily so. The factor limiting development at one instant may not be so the next. Instead, the actual situation is more likely to be rather complex, with the interaction of many factors defying description—at least in terms of our present measurement capabilities. On page 26, for example, the authors trap themselves in the quicksand of uncertainty when they pursue discussion under the topic "Temperature optima for adults and the influence of temperature on the abundance, migrations and shoaling of fish." They opine (reviewer's italics): "Nearly all fish stocks have *specific optimum* temperatures. ... A thorough knowledge of these optimum temperatures is necessary for the prediction of fish concentrations. With such knowledge, predictions of temperature ... can be used for predicting the seasonal abundance of a given stock of fish. ..." But, only to undermine this somewhat assertive opinion, they go on to state: "The problem is further complicated by the fact that the *environmental requirements change* during the various stages of growth ... , that the temperature requirements of certain species also change seasonally, at least in connection with spawning, [and] ... [that] the concentration of food is temperature dependent, which makes the determination of the 'optimum temperature' for a fish *exceedingly complicated* in a few cases. In spite of this, the seasonal and year-to-year variations in thermal *and other conditions* will result in varying distribution and abundance on a given fishing ground. ..."

Such careless exposition, which might be partly described as confounded speculation, can only leave the reader confused. What all of this indicates is an urgent need to reassess the methods by which our hypotheses of ecological cause-effect relationships have been and are being tested, to reject the majority which are now archaic, and to give greater consideration to some of the newer (albeit more sophisticated) ones, particularly the techniques of limiting-factor, multiple-factor, and time-series analysis.

The foregoing criticisms constitute but a few exceptions to a work that otherwise imparts a wealth of information, all of which, regardless of acceptability, reflects scientific progress in our never-ending search for knowledge of what transpires *in and above* the

sea. And well the oceanographer might heed the timely advice the authors give regarding conditions at the *edge* of the sea (p. 104): "In this connection it must be pointed out that the oceanographers are neglecting the shallow seas and the coastal zones of seas even more than the marine biologists. Many of the shallow water problems are hydrodynamically perhaps less interesting—and because of their irregular appearance more difficult to approach—than those of the high seas. Nevertheless, the great and most many-sided significance of all the shallow seas to the marine biology, and to the fisheries as well, means a challenge to all marine scientists. ..."

One error in the glossary (p. 124) concerns the definition of *tychoplankton*, which the authors label "... organisms which spend part of their life-cycle as plankton, like the oyster larvae. ..." Actually, *tychoplankton* according to Ruttner (*Fundamentals of Limnology*, Univ. of Toronto Press, 1953) are forms of the littoral community occurring in the plankton "accidentally," or adventitiously, such as sessile diatoms which break free under turbulent water conditions. Those organisms occurring as plankton during early life history stages are, before they assume a free or attached benthic existence, properly classed as *meroplankton*.

*Fisheries Hydrography*, in general, does not read as smoothly as one might wish. Besides occasionally awkward and vague phraseology, some of which has already been discussed, grammatical inaccuracies are conspicuous by their frequency. Much of the responsibility for this lies with the book's editors, but part of the difficulty could conceivably be attributable to the vagaries of translation (though there is no indication that the book was originally written in another language).

The selection of figures in support of the text is generally good, but their reproduction in several instances is far from satisfactory (e.g., Figures 48–50 on pp. 79 and 80). Despite the book's unquestioned worth as a stimulus for better evaluation of biophysical and biochemical interactions occurring continuously beneath the surface of the sea, the above shortcomings do not seem to justify its relatively high cost.

JOSEPH H. KUTKUHN

U. S. Bureau of Commercial Fisheries  
Biological Laboratory  
Galveston, Texas